

1

2,873,466

## STEEL WOOL GRINDING AND POLISHING WHEEL

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Application December 1, 1954, Serial No. 472,274

2 Claims. (Cl. 15—230)

This invention relates to grinding, abrading, polishing and cutting wheels, and more particularly to a novel structure for such wheels which are characterized, among other things, by great strength, resistance to bursting and excellent heat transfer capacity.

The wheel comprises essentially a reticular matrix consisting of thin, elongated strands or strips of metal such as steel, aluminum, copper, or the like. An example of this material is the widely available material known as "steel wool." Such a wool, as understood herein, comprises an agglomerate mass of these thin, elongated fiber-like strips which are twisted and intertwined with each other in a random mass arrangement. It is well known that after using a mass of steel wool alone for a short while for the purpose of burnishing and polishing, the mass begins to lose the uniformity of its structure and ultimately falls apart. It is obvious, therefore, that the uses of such steel wools and the like are limited to various hand operations and are not amenable to methods where automatic machinery is required to perform mass production jobs of grinding, abrading, polishing and burnishing.

In order to make this metallic wool useful for machine operated production and for economical performance, I combine this metallic wool with a resin binder or a combination of resin binders into a hard, cohering conglomerate mass which may be shaped in the form of a wheel or the like. The wheel, when mounted by suitable means on the spindle of a machine may be rotated against various products that are to be polished, burnished, ground or abraded.

The metallic wool may be selected in all gradations between fine and coarse depending upon the nature of the grinding, abrading or polishing job that is required.

For some purposes the amount of resin binder required is that sufficient merely to form a thin film upon the metallic strands to cause them to adhere to each other at their intersecting points and to be fixed substantially rigidly in position so that the metallic wool is no longer resilient in the mass. This may be accomplished by suitable curing of the resin after it has been applied to the strands. A wheel formed in this manner has an open reticular structure with spaces between strands, whereby the abrading surface of the wheel may be cooled by heat transfer through said strands, the motion of the wheel causing air to circulate through the body thereof to cool the strands. Since the periphery of the wheel will also have open spaces between resin coated strands, the wheel will readily reject particles ground or abraded from the objects that are treated by the wheel, thereby obviating the deleterious effects of clogging the operating surface.

It is also within the purview of the invention to heat treat the metallic strands to increase their hardness to an extent depending upon the ultimate use to which the wheel is to be put.

I have found that when coarse metal strands are incorporated in the grinding wheel, such things as automobile

2

body paint may be removed. With relatively finer grades of metal wool in various gradations, I find that copper, brass and aluminum may be polished and burnished both in the raw sheet and in the manufactured product more rapidly and more efficiently than with the present steel wire brushes which are considerably more expensive. The wheels of the present invention may also be used for removing rust from utensils, tools, raw steel billets, and the like.

Still other objects and advantages of my invention will be apparent from the specification.

The features of novelty which I believe to be characteristic of my invention are set forth herein and will best be understood, both as to their fundamental principles and as to their particular embodiment, by reference to the specification and accompanying drawings, in which:

Figure 1 is a side elevation of one type of grinding wheel made in accordance with the present invention;

Fig. 2 is an end view of the embodiment of Fig. 1, partly in vertical cross section; and

Fig. 3 is a schematic view of one means for dipping the metallic wool strands in a resin binder.

Referring now to the drawings in detail, there is shown a grinding wheel (Figs. 1 and 2) generally designated 21 formed of metallic strands 22 substantially uniformly distributed throughout the mass thereof. Strands 22 are coated by a fine film of thermosetting resin which has been cured to cause strands 12 to adhere to each other at their points of intersection to form a substantially hard, non-resilient mass. In view of the exigencies of drawing techniques, the thin film of resin binder is not shown on the strands in the illustration of Figs. 1 and 2, but it is to be understood that such a film has been applied to said strands. Wheel 21 has a central ring 23 whereby it may be mounted on a shaft 24. In some embodiments end plates 25 of suitable material such as steel, fiberboard or the like, may be attached to the sides of the wheel to provide for structural and operating stability.

In coating the metallic strands with resin, the mass of metallic strands may be shaped into the form of a grinding wheel and dipped in a receptacle 26 containing a thermosetting resin 27 in the fluid state. Wheel 21 is then removed from the fluid resin, the excess resin is permitted to drain off, and the wheel is subsequently heated or otherwise treated to cure the resin, thereby causing the wheel to become substantially hardened into a permanent shape suitable for use upon the spindle of a grinding machine or of a motor driven hand tool. The metallic wool wheel is now sufficiently hard so that it is substantially self-supporting throughout its entire mass when it is secured to and rotates around the spindle of a machine or motor.

In the specification, I have explained the principles of my invention, and the best mode in which I have contemplated applying those principles, so as to distinguish my invention from other inventions; and I have particularly pointed out and distinctly claimed the part, mode or combination which I claim as my invention or discovery.

While I have shown and described a certain preferred embodiment of my invention, it will be understood that modifications and changes may be made without departing from the function and scope thereof, as will be clear to those skilled in the art.

I claim:

1. A device for abrading or the like, comprising a plurality of elongated metallic strands, said strands being intertwined at least at some parts thereof with each other into a reticular mass, a sufficient amount of binder rigidly connecting said strands at only the intersecting areas thereof to form a matrix, said reticular mass having between said intertwined strands a plurality of open spaces